DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health
Laboratory

Shiga Toxin Producing *Escherichia coli*

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Background

- In 1999- 100,000 illnesses, 3200 hospitalizations, 91 deaths in US;
- Asymptomatic shedding, non-bloody diarrhea, hemorrhagic colitis, HUS;
- contaminated food or H20 & infected animals or persons;
- O157 most recognized- others just as common;
- >100 serotypes, O157 sorbitol negative, Others undistinguishable.

Conventional Culture

Testing for STEC

- Culture media
  - **Sorbitol-MacConkey (SMAC) agar**
  - **Cefixime-Tellurite (CT)-SMAC**
  - **Chrom agar**

- **Disadvantages**
  - **Some *E. coli* O157:H7 can have unusual biochemical characteristics (e.g., sorbitol positive)**
  - **Low numbers may not be isolated**
  - **Sensitivity of culturing for *E. coli* O157:H7 may be low (50-60%)**
  - **Misses non-O157:H7 STEC**

STEC Non culture methods

- 1995, FDA cleared first rapid assay for detection of STEC from stools.
- EIA – Enzyme Immunoassay for detection of stx 1 & 2.
- Labs –rely on these tests rather than culture methods.
- Lose epidemiologic and surveillance information without isolate.

Non culture methods

- Pros:
  - Advantages for care of the individual patient.
  - Rapid and easy to perform.
  - Enables detection of non-O157 STEC isolates.

- Cons:
  - False positives – reportable disease.
  - Inability to easily obtain critical isolates needed for public health surveillance activities.
    - Antimicrobial resistance.
    - PulseNet molecular subtyping.
    - Detection of novel or altered strain types .

STEC in Delaware

Pathogen Detection and Characterization

DPHL STEC Recommendations

- Clinical labs- submit shigatoxin positive broths and/or original stool;
- Tests original and new broths –stx 1 & 2 by EIA or PCR;
- Sub positive broths – tests up to 20 colonies for stx 1 & 2 by EIA or PCR;
- Look for O157 and screen colonies with RIM E.coli antisera;
- Confirm biochemically- ID of E.coli.

Serotyping & PFGE

- Serotype for O157 & top 6 “O” groups (026,045, 0103,0111,0121,0145);
- If unable to serotype –send to CDC;
- Pulse-Field Gel Electrophoresis- within 4 days from receipt- Pulsenet;
- Analyze gels and send to CDC Pulsenet database.

Conclusions

- **Timely laboratory diagnosis of STEC illness**
  - **prevent inappropriate treatment .**
  - **allow for supportive care to prevent HUS.**

  - **Requires communication between hospital and state PHLs to ensure optimal testing.**

- **Including PCR testing to conventional testing algorithms - guide appropriate and cost effective public health efforts and focuses resources on optimal STEC recovery .**

- **The recover of STEC isolates is essential to the tracking of cases and detection of outbreaks.**

  - **Enables prompt PFGE subtyping and further characterizations.**
  - **Allows for public health interventions (ie. Recalls) to prevent additional infections.**

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